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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/687,825

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Koichi Tsuchiya

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EXAMINER

WEINSTEIN, LEONARD J

ART UNIT

PAPER NUMBER

3746

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/687,825	Applicant(s) TSUCHIYA ET AL.	
	Examiner Leonard J. Weinstein	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 13-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 13-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the amendments of May 9, 2007. It is noted that claims 1, 4, and 13 have been amended and claims 10-12 have been canceled. In making the below rejections and/or objections the examiner has considered and addressed each of the applicant's arguments.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-2 and 4 are rejected under 35 U.S.C. 102(e) as being anticipated by Park et al. 7,100,743. In the embodiment shown in figure 11, Park teaches all the limitations of the invention as substantially claimed, per the amendment of May 9, 2007, for a reciprocating compress including: a motor unit 22, a compressing unit 30 disposed over said motor unit 22 and including a compression chamber 32, a piston 31 disposed for reciprocation in said compression chamber, a crankshaft 200 configured to convert rotating action of said motor unit 22 into reciprocating action of said piston 31, an enclosed container 11 accommodating said motor unit 22 and said compressing unit 30 and having a lubricant oil portion, figure 1, configured to pool lubricant oil, wherein a crankshaft 200 includes a centrifugal pump 240 disposed at a lower section, figure 12, of said crankshaft 200 and opening into the lubricant oil portion of said container 11, a pair of spiral pumps 242b, functionally independent (col. 14 ll.

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14-19), disposed at a middle section 212 of said crankshaft 200, fluidically connected, via 241 and 246, with said centrifugal pump 240, and having leading grooves, elements 243a and b, running in opposite directions, as the two grooves are helical (col. 5 ll. 56-59) and have diverging paths from one another as can be seen in figure 11, wherein said spiral pumps 242b respectively have upper ends, top of elements 242b, and lower ends, portion of elements 242b in direct communication with elements 243a and b, and said centrifugal pump 240 is fluidically connected with said spiral pumps 242b only at said lower ends thereof via one communicating section 242a, and a pair of vertical holes elements 244a and b, functionally independent (col. 14 ll. 14-19), are provided at an upper section, area of element 200 defined above element 231, of said crankshaft 200, said vertical holes, elements 244a and 244b, opening into said container 11 and fluidically connected with said spiral pumps 242b, respectively; a throttle section 245 disposed in said lubricant oil pooling portion, figure 1, for allowing the lubricant oil pooled in said container 11 to be drawn into said centrifugal pump 240, and a hollow cylinder 241 extending upward from a lower end of said crankshaft 200 and having an axis slanting toward an outer wall of said crankshaft, figure 11; crankshaft 200 further includes an eccentric shaft 220, a sub-shaft section 230 and a main-shaft, 211 and 212, section which vertically sandwich, figure 11, the eccentric shaft 220, wherein said compressing unit 30 includes a sub-bearing 12 and a main-bearing, section of element 22 shown in figure 2, both of which are formed to cross with an axis of said compression chamber 32 at substantially right angles, figure 2, for supporting said sub-shaft section 230 and said main-shaft section, 211 and 212, respectively, and a linking section 33 that links said piston to said eccentric shaft 220.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claim 4 rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Park et al. 7,100,743 in view of Andrione et al. 4,386,859. Park teaches all the limitations of the invention in the embodiment of figure 11 as discussed above and further teaches the limitations including an eccentric shaft 220, a sub-shaft section 230 and a main-shaft section, elements 211 and 212, which sandwich-vertically, figure 1, the eccentric shaft 220; and a sub-bearing 12 and a main-bearing, section of element 22 shown in figure 2. The following limitations as disclosed and not explicitly claimed are taught by Andrione '859 wherein a sub-bearing, elements 46 and 36, and a main-bearing, bearing surface defined by element disposed between elements 20 and 30 and partially fitting within the inner circumference of element 22, are disposed on opposite sides of an eccentric 32 (sub-bearing and main-bearing of Andrione '859 miss-identified as elements 46 and 36 respectively in the office action of February 9, 2007). Therefore Andrione '859 clearly teaches the limitations including: a compressing unit 18 having a sub-bearing, elements 36 and 46, and a main-bearing, bearing surface defined by element disposed between elements 20 and 30 and partially fitting within the inner circumference of element 22, both of which are formed to cross with an axis of said compression chamber 12 at substantially right angles for supporting a sub-shaft section 28 and said main-shaft section 34 (compression chamber and sub-shaft section miss-identified as 20 and 66 respectively in the office action of February 9, 2007). Further Andrione '859 also teaches a thrust bearing 50 over a sub-shaft section 28 (Andrione '859 – col. 2 ll. 62-66). It would have been obvious to one having ordinary skill in the art at the time the

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invention was made to provide a sub-bearing for a sub-shaft of a crankshaft of a compressor between a compression unit and a flat radial fixed surface of a thrust bearing to ensure no sliding contact between cast iron surfaces during an operation of a compressor (Andrione '859 col. 1 ll. 60-66).

6. Claims 1, 3, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. 7,100,743 in view of Andrione et al. 4,493,226. Park teaches all the limitations of the invention in the embodiment of figure 11 as discussed above but fails to teach the limitations as taught by Andrione '226 including: a vent hole 56 provided at an upper section, figure 4, of a centrifugal pump, 20 and 30, opening into a container 10; and a vent hole 56 opening through an upper surface, 50 of 22, of the centrifugal pump 18, wherein the upper surface, 50 of 22, faces upward in an axial direction, figure 4, of a crankshaft 18. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the vent hole a suction chamber of within a crankshaft of a compressor in order to allow any gas within the oil traversing through a suction path, to be removed outside a zone of a crankshaft (Andrione – col. 3 ll. 2-4).

7. Claims 5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. 7,100,743 i. v. of Andrione et al. 4,386,859 as applied to claim 4 above and further in view of Andrione 4,493,226 as applied to claim 1 above. Park teaches all the limitations of the invention in the embodiment of figure 11 as discussed above including a pair of vertical holes 244a and b, that lubricate a thrust bearing 41 provided over a sub-shaft section 230, and paths, elements 248, connected to two functionally independent grooves, elements 243a and b, and vertical holes, elements 244a and b, that pump the lubricating oil upwardly to supply oil to the thrust bearing 41 that is provided over a sub-shaft section 230. A combination of Park and

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Andrione '859 fails to teach the limitations that are taught by Andrione '226 including: a helical groove 54 provided on an outer wall of a sub-shaft section 20, having a leading groove fluidically connected with a vertical hole 52. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a helical groove on an upper sub-shaft of a crankshaft that communication with vertical holes permitting a flow of oil in order to provide a stable supply of oil to a sub-shaft and bearing in a regular and reverse direction of rotation intended to change the compression capacity of a compressor (Park col. 2 ll. 40-43 and col. 4 ll. 23-27).

8. Claims 13-14 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. 7,100,743 i. v. of Andrione et al. 4,386,859 as applied to claim 4 above and in further view of Andrione 4,493,226 as applied to claim 1 above. Park teaches the limitations of the invention in the embodiment shown in figure 11, as discussed above and further teaches the following: a compressing unit 30 including a cylinder block 34, a compression chamber 32 formed in said cylinder block 34, a lower main bearing 22 provided about a main section 211 of a crankshaft 300 to rotatably support the crankshaft 200 at the main section, an upper sub bearing 12 provided about a sub-section 212 of the crankshaft 200 to rotatably support the crankshaft 200 at the sub-shaft section 230 thereof, a main section, 211 and 212, of the crankshaft 200 having a fluid suction path 241 formed therein and opening into a lubricant oil pooling portion, figure 1, of a container 11, a main section, 211 and 212, of having a pair of first spiral pump grooves, elements 243a and b, formed in an outer surface, fluidically connected to the fluid suction path 241, and being functionally independent one another (col. 14 ll. 62-67), wherein said spiral pumps 242b respectively have upper ends, top of elements 242b, and lower ends, portion of elements 242b in direct communication with elements 243a

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and b, and said centrifugal pump 240 is fluidically connected with said spiral pumps 242b only at said lower ends thereof via one communicating section 242a, the eccentric section 220 of the crankshaft 200 has a pair of vertical holes 244a and b formed therein, the vertical holes, elements 244a and b, being fluidically connected to the first spiral pump grooves, 243a and b, and being functionally independent of one another (col. 17 ll. 62-67). Further Park teaches a main bearing 22 and sub-bearing bearing 12 and in the alternative Park i.v. Andrione '859 as discussed above (§ - 5) teaches a main bearing and a sub bearing having axes that are substantially perpendicular to the axis of reciprocal motion of the piston wherein the sub-bearing is disposed at an upper section of the crankshaft about a sub shaft section to rotatably support the sub section (Andrione '859 –figure 1). A combination of Park and Andrione '859 fails to teach the limitations that are taught by Andrione '226 including a sub-shaft section 20 of said crankshaft 18 having a spiral pump groove 54 formed in an outer surface of a sub-shaft section 20 and connected to a vertical hole 52. Further Park i.v. of Andrione '226 teaches a vent hole opening through an upwardly facing surface as discussed above (§ - 6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the spiral pump groove of Andrione '226 to the vertical holes of Park to provide a pair of functionally independent spiral pump grooves arranged feed lubricant oil from one of a first spiral pump groove to a second one of said second spiral pump grooves in order to provide a stable supply to lubricate a thrust bearing (Andrione '859 col. 1 ll. 60-66) in both a regular and reverse direction of rotation intended to change the compression capacity of a compressor (Park col. 2 ll. 40-43 and col. 4 ll. 23-27).

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. 7,100,743 in view of Andrione '859 and Andrione '226 as applied to claim 13 above, and further

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in view of Khoo et al. 5,842,420. The references cited and applied above teach the limitations of the invention as discussed above but fails to teach the limitation taught by Khoo including a main section 64 of a crankshaft 30 that constitutes a slant path 62 slanted (β) relative to an axis 61 of the main section of the crankshaft 30 and constituting a centrifugal pump. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a slanted fluid suction path constituting a centrifugal pump in order to increase the inlet area for picking up more oil from a sump thereby improving the degree of lubrication of the components of the compressor and reducing noise emissions (Khoo – col. 1 ll. 65-67 and col. 2 ll. 1-3).

10. Claims 6-7 rejected under 35 U.S.C. 103(a) as being unpatentable over Park. It is well known within the art to use a plurality of electric motors for use as the motor component of a reciprocating compressor. Park does nothing to change this well known practice and therefore it would have been obvious to one having ordinary skill in the art to provide a three-phase induction motor or a single-phase resistant-start induction motor.

Response to Arguments

11. Applicant's arguments filed May 9, 2007 have been fully considered but they are not persuasive. The applicant argues that the embodiment cited in the office action of February 9, 2007 does not teach first spiral pump grooves having upper and lower ends and a centrifugal pump fluidically connected with the spiral pumps only at the lower ends through one communicating section. As discussed above the embodiment shown in figure 11 of Park 7,100,743 teaches the limitations as claimed in the amended claims. In making the rejections above the examiner has cited an alternate embodiment of the primary reference Park 7,100,743, which was used to reject claim 1 in the amendment of November 16, 2006, to reject

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claim 1 of the amendment of May 9, 2007. Claim 13 amended in a similar manner to claim 1 is rejected under 35 U.S.C. 103(a) using the same references cited in the office action of February 9, 2007 with the exception of the reference to the same alternate embodiment of Park used to reject claim 1. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

12. The examiner makes note of an error in the office action of February 9, 2007 with regards to paragraph 9. The recitation of claims 13-14 and 15-16 is incorrect and should be claims 13-14 and 16-17. The limitations of claim 17 are the same as those of claim 8 that are taught by Park et al. 7,100,743 in view of Androne et al. 4,493,226, and addressed in paragraph 7 of the office action of February 9, 2007. The teachings of Androne '226 in combination with Park as applied to claim 1 are set forth in part the basis of rejection under 35 USC 103(a) in paragraph 9 of the office action February 9, 2007. The limitations of claim 17 were therefore incorporated and addressed in office action. Further the amendment to claim 13 applied to claim 17 presents a new limitation that necessitates a new grounds for rejection and therefore the omission of claim 17 in paragraph 9 of the office action of February 9, 2007 should not be cited as grounds for making this rejection Non-Final.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of

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the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonard J. Weinstein whose telephone number is 571-272-9961. The examiner can normally be reached on Monday - Thursday 7:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Stashick can be reached on 571-272-4561. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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